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Factors explaining the choice of a finance major: the role of student characteristics, personality and perceptions of the profession

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Abstract

This paper examines the role of student characteristics, personality, and perceptions of the banking and finance profession in determining the choice of an undergraduate finance major. The data employed is drawn from a survey of first-year business students at a large Australian university. Student characteristics examined include gender, secondary school studies in accounting, business and economics, grade point average and attendance mode. Perceptions of the banking and finance profession revolve around questions of overall interest, relationships of persons working within the profession, the manner in which the profession deals with problems and tasks, and the nature of these problems. A binary probit model is used to identify the source and magnitude of factors associated with a student's choice of major. The evidence provided suggests that the choice of a finance major is a function of students' overall interest in the profession, perceptions of how the profession deals with problems and tasks, the nature of these problems and tasks, mode of attendance and, to a lesser extent, gender. The study emphasises the need to incorporate factors associated with students' personality and perceptions in analyses of this type.

Keywords: finance majors; student characteristics; student personality; student perceptions

Introduction

In Australia, as elsewhere, there has been a dramatic increase in the number of students undertaking undergraduate business degrees during the 1990s. As shown in Table 1, enrolments in all Australian business-related degrees rose by nearly fifty percent between 1990 and 1999. However, this increase is not evenly distributed across discipline areas within this broad field of study. For example, where economics once accounted for nearly ten percent of all undergraduate business degrees, it now accounts for less than seven percent, growing only 3.23 percent over the decade. The relative decline in economics enrolments has

already been well documented by Lewis and Norris (1997) and Millmow (1995; 2000). A comparable decline is found in accounting. Despite the fact that the number of students enrolling in all accounting degrees has increased by more than 8.95 percent over the decade, the share of total enrolments in accounting degrees within the business-related field has fallen from 28.40 percent in 1990 to 20.68 percent in 1999 (Worthington and Higgs, 2001). The relative decline in Australian undergraduate accounting and economics degrees are generally comparable to similar changes in US business degrees over this same period.

In sharp contrast, Australian undergraduate finance degree enrolments have increased by 225.23 percent over the 1990s, amounting to an annualised growth rate of 12.52 percent. This significantly exceeds the annual rate of growth in both the closely related areas of accounting (0.86 percent) and economics (0.32 percent) and in 'other' business disciplines (5.43 percent) included in Table 1 (including human resource management, international business, general management and marketing). Unfortunately, almost no empirical evidence exists concerning the factors that affect the choice of individual students to major in finance, which could be used to partially explain these changes. For example, while a number of reasons have been given for the declining popularity of economics degrees in Australia, including the massive fall in the number of secondary school students taking economics and the rising popularity of competing business study programs, similar sorts of reasoning have not been used to explain the strengthening position of the finance discipline.

<TABLE 1 HERE>

Several other issues are equally deserving of attention in any study explaining the choice of an undergraduate business major. First, attention should be paid to measuring what appear to be relatively important factors in the choice of a major, that is, student personality and perceptions of, and interest in, the profession itself. While some business-related studies have used gender, grade point average, and past studies in the discipline, amongst others, to proxy interest in the subject matter, very few have concerned themselves with directly measuring these important determinants of a choice of major. Second, the female participation rate in finance majors is relatively low when compared to all other business-related studies save economics. For example, in Australia in 1999 the female participation rate in finance degrees was 43.7 percent, as against 41.2 percent for economics, 53.5 percent for accounting and 51.6 percent across all business-related degrees (Worthington and Higgs, 2001). This is akin to US

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figures where the female participation rate in finance is similar to that in economics and significantly less than enrolments in other business-related degrees, including accounting. However, while the debate on gender bias in finance education has been the subject of increasing attention [see, for instance, Didia and Hasnet (1998), Henebry and Diamond (1998) and Bauer and Dahlquist (1999)] none of these studies have linked the purported gender bias with the choice of a finance major, nor made allowance for the complex interaction between gender and the more general issues of personality, interest and perceptions of the profession. It is with these considerations in mind that the present study is undertaken.

Accordingly, the purpose of the present paper is to investigate the role of both student characteristics and perceptions in determining enrolment in Australian finance majors. More particularly, the paper aims to examine the following determinants of a student's choice of major: (i) student personality, (ii) students' interest in and perceptions of the banking and finance profession, (iii) a student's past academic performance within the finance discipline and (iv) gender preference for a finance major. The paper itself is divided into four main areas. The first section briefly reviews the literature on factors associated with the choice of a business major. The second section explains the empirical methodology and data collection employed in the analysis. The third section discusses the usefulness of these models for predicting student majors in finance. The paper ends with some brief concluding remarks.

Literature review

Few studies have modelled the decision by business students to major in finance. Fortunately, a widespread literature does exist concerning the choice of major in the two disciplines most closely related to finance; that is, accounting and economics. Jackling (2001, p. 3), for example, argues that "the decline in the number of students graduating from accounting courses has in part, been attributed to the more dynamic alternatives within the domain of commerce education, particularly in the associated fields of finance and business advisory services". Albrecht and Sack (2001, p. 21) have also commented on finance as an attractive alternative to accounting and the preparation a finance major provides for "…careers with professional service firms and corporate finance departments, employers that traditionally recruited accounting students". Of course, there are still substantial differences between finance and accounting and finance and economics, and these must exert an influence on strict

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comparability across the disciplinary literature. For instance, finance is usually regarded as being more conceptual and mathematical than accounting owing to its background in microeconomic theory, while the focus by finance on financial statement and market information often makes it appear more applied when compared to economics. Nevertheless, within this broad literature four themes have been put forward to explain the choice of a particular major.

The influence of personality

A recurrent theme in the literature is that "…students choose specific majors which they see as compatible with their particular personality styles" (Saemann and Crooker, 1999, p. 2). Myers and McCaulley (1985), for example, have shown that the business major in general is not of particular interest to creative individuals who are more attracted to the liberal arts, while Booth and Winzar (1993) found there was a strong bias towards sensing, thinking and judging personalities in accounting, Wolk and Cates (1994) concluded that a lower percentage of accounting students were innovators when compared to business majors and Gul and Fong (1993, p. 38) reported that introverted students are more suited to accounting as a career and generally prefer working in an environment where there is an emphasis on individual rather than group effort. Alternatively, Saemann and Crooker (1999, p. 15) confirmed that while "students [who] enrolled in business schools tend to be less creative than the general university population…our study shows that declared accounting majors are similar to other business students in terms of creativity".

Other work has confirmed that personality type plays a key role in the choice of a major. Lawrence and Taylor (2000) and Lawrence and Taylor (2000) found that students with sensing, thinking and judging personality types were more likely to select an accounting major. Wolk and Nikolai (1997) obtained similar results when they concluded that accounting students were predominantly extroverts, sensors, thinkers and judgers. Conversely, Ramsey *et al.* (2000) showed that cooperative learning appeals more to extroverts and feelers, though most accounting students were introverted and thereby associated with a lower preference for cooperative learning. Fortin and Amernic (1994) used a personality indicator to conclude that accounting majors generally score lower on scales representing breadth of interest, complexity, innovation, self esteem and social participation, but higher on organisation and value orthodoxy. Lastly, a study by Oswick and Barber (1998) found no significant relationship between personality traits, accounting performance and, by implication, choice of an accounting major.

The role of interest in the profession

A second theme that has received attention is that the level of interest in the discipline and perceptions of the profession play a key role in the choice of a major. For example, Dynan and Rouse (1997), Lewis and Norris (1997) and Jensen and Owen (2000) have identified the importance of interest and perceptions of the profession as factors determining the choice of an economics major, and Easterlin (1995) has identified preferences as the key factor in the generational switch to business studies. Fortin and Amernic (1994, p. 65) concluded that "…interest and aptitude for the subject matter appear to be the driving forces behind the students' choice of accounting as a major…intrinsic values such as independence in action and solving challenging problems (intellectual stimulation) are also key factors apparently motivating students' choice of concentration".

In accounting, Mladenovic (2000) found that students tend to perceive accounting as primarily numerical, objective and non-controversial with an affinity with mathematics and statistics, while Saemann and Crooker (1999) found that traditional perceptions of precision and order in the profession discouraged more creative individuals from majoring in accounting as did Geiger and Ogilby (2000). Recent work by Jackling (2001) has confirmed that student's do not perceive accounting very positively and that the perceived emphasis on 'number crunching' fails to attract students with creativity and people-orientated attributes. Lastly, Krishnan *et al*. (1997) concluded that students' generally believed that the finance course was challenging, which in turn was driven by the impression that the course is heavily quantitative and theoretical, while Henebry and Diamond (1998) found that as many as a fifth of all students withdrew from introductory finance because of the demanding quantitative and theoretical content.

The effect of past academic performance and study in the discipline

Another theme in the choice of business major literature is that students' choice of major is determined by past performance within the discipline, either in comparable secondary level studies or in first-year university units. One dimension of this work relates to mathematical preparation. For instance, Dynan and Rouse (1987) included a math SAT score, along with dummy variables for pre-calculus, first semester calculus, second semester calculus, multivariate calculus, and linear algebra or higher as indicators of student preparation and aptitude for an economics major. Similarly, Didia and Hasnat (1998) included the highest math grade at college as an indicator of student preparation and aptitude for a finance major, along with the grade obtained in accounting and economics.

Secondary level study in the discipline itself is also thought to influence the choice of major in university. For example, Lewis and Norris' (1997, p. 9) found a consensus that "school students are taking 'easier' courses such as business studies and legal studies rather than economics" and this was eventually reflected in declining enrolments in undergraduate economics degrees and majors, while Anderson and Johnson (1992) found that while the number of students taking secondary-level economics had declined in all Australian states and territories, the decline had been less in those states where "economics has few alterative business-related courses with which to compete".

Another final dimension of this work relates to performance in introductory courses. For instance, Cohen and Hanno (1993) found that students perceived success in the introductory course as a signal to choose accounting as a major. Geiger and Ogilby (2000) also concluded that performance in the first course was instrumental in determining the choice of an accounting major, along with Turner *et al.* (1997). However, Stice *et al*. (1997) found that contrary to prior research, better classroom performance did not influence the decision to major in accounting. The purported link between performance in university accounting and the choice of an accounting major in conjunction with secondary school study in accounting has also received some attention. Koh and Koh (1999), for example, found that students with prior (high school) accounting did not perform as well as students without prior knowledge.

Perhaps the main complicating factor is that in Australia, as in the US and the United Kingdom and in contrast to both accounting and economics, finance is not offered as either a secondary school subject or as an introductory course in first-year university studies. This means that students may have very little familiarity with the study of finance before embarking upon their major. Nonetheless, it is usually found that finance majors are disproportionately drawn from students who have studied accounting, economics or business studies in secondary school and that aptitudes displayed in introductory university courses in these subjects often reflect well on performance in the ensuing finance courses.

The role of gender bias

The final theme in the choice of business major is the role of gender bias. These include suggestions that the curriculum, along with the pedagogy and types of evaluation instruments, are of less interest to women, and that the evaluation techniques employed favour male learning styles and therefore performance. As an example, Sen *et al*. (1997, p. 69) found that gender "…turned out to be a statistically significant determinant of student achievement in principles of finance courses". Didia and Hasnet (1998), Henebry and Diamond (1998) and

Bauer and Dahlquist (1999) all also found that female participation in finance is relatively low. Certainly, evidence regarding the low participation rate by females in finance majors is not hard to find. Bauer and Dahlquist (1999) cite the female percentage of graduating US bachelor's degrees in 1994/95 as 33.3 percent for finance, 30.8 percent for economics and 56.2 percent for accounting, while in Australia in 1999 the female participation rate in finance degrees was 43.7 percent, as against 41.2 percent for economics and 53.5 percent for accounting (Worthington and Higgs, 2001).

This study builds upon the literature concerning these themes in two important ways. First, it applies several of the techniques used to analyse the interests, personalities, perceptions and other characteristics of accounting and economics majors and applies them to finance majors. And second, it combines the main themes in a single study and explicitly links interests, personalities, perceptions and other characteristics with the choice of finance major over other business majors, including accounting and economics.

Research method

The data used in this study is based on a sample of students studying for an undergraduate business degree at one of Australia's largest universities. This award consists of a set of core units in conjunction with elective majors, double majors and extended majors in accountancy, finance, economics, international business, management and marketing. The degree's tertiary entrance score is common to all majors, and students initially matriculate to a nominated major or majors. However, after the first semester students may apply to change major provided that they satisfy the appropriate unit prerequisites and are able to complete the proposed major within the units remaining in the program.

The analytical technique employed in the present study is to specify students' choice of major as the dependent variable (y) in a regression with student personality, perceptions and other physical and educational characteristics as explanatory variables (x). The nature of the dependent variable indicates discrete dependent variable techniques are appropriate. Accordingly, the following binary probit model is specified:

$$\text{Prob}(y=1) = \int_{-\infty}^{\beta' x} \phi(t)dt = \Phi(\beta' x) \qquad (1)$$

where x comprises a set of student characteristics posited to influence the selection of a finance major, β is a set of parameters to be estimated and the function Φ indicates the standard normal distribution. The coefficients imputed by the binary probit model provide

inferences about the effects of the explanatory variables on the probability of the choice of a particular major.

The dataset employed is composed of three sets of information. The first two sets of information are derived from a survey administered to first-year students, while the remaining set represents university records cross-correlated with the survey responses. The survey was administered to all students in class following an item of compulsory assessment. Three hundred and forty usable responses were obtained from the population of four hundred enrolled students (including absentees) representing an eighty-five percent overall response rate.

The first set of information relates to the choice of major and comprises the dependent variable in the binary probit model specified in Equation (1). Students are categorised as either: (i) those who have not nominated a finance major, whether as a single or extended major, or as part of a double major ($y = 0$); and (ii) those who have nominated a finance major as part of their program ($y = 1$). The first group consists of all students undertaking single or extended majors in accountancy, economics, management and marketing, excluding double major students combining studies in these areas with a major in finance. Two hundred and fifty-seven students, or seventy-six percent of cases are categorised as non-finance majors. The second group consists of students undertaking at least one major in finance. Eighty-three students, or some twenty-four percent of cases, are identified as finance majors. The sample fairly approximates the population where finance majors (as defined) make up twenty-eight percent of first-year students.

The next two sets of information are specified as explanatory variables in the binary probit regression model. The first of these sets of information relates to several student characteristics obtained by the survey. Information collected includes a personality score and perceptions of the finance profession along a range of criteria. The survey included two instruments to measure students' inherent creativity and perceptions of the banking and finance profession. The first instrument required students to complete Gough's 30-item Creative Personality Scale (Gough 1979). Possible scores (*PRS*) on this simple adjective checklist range between –12 and +18 with a higher score indicating a more creative individual. Saemann and Crooker (1999) used an identical instrument in their study of accounting majors on the basis of its brevity and reliability (0.70 using a weighted composite technique). Appendix A lists the adjectives surveyed and the scoring mechanism applied. No particular *a priori* sign is hypothesised when finance major is regressed against personality score.

The second measure required students to assign ordered preferences on a 5-point scale between thirty-six opposing adjectives on the basis of their perceptions of the banking and finance profession. Saemann and Crooker (1999) surveyed perceptions of the accounting profession using a similar instrument. These items are arrayed along four dimensions of perceptions relating to the banking and finance profession; namely, interest (*INT*), the level of individuality (*IND*), precision or thoroughness (*PRE*) and structure or rule-orientation (*STR*). 'Interest' includes five items intended to capture students' level of interest in the finance profession. The pairings include 'boring vs. interesting', 'dull vs. exciting' and 'monotonous vs. fascinating'. 'Individuality' aims to reflect students' perceptions of the relationships of persons working within the profession. The four pairings employed embrace 'solitary vs. people-orientated' and 'introvert vs. extrovert'.

The fourteen items for 'structure' relate to students' perceptions of the way in which financial analysts deal with problems and tasks. Pairings include 'structured vs. flexible' and 'routine vs. unpredictable'. Finally, 'precision' aims to address students' perceptions about the nature of the types of problems and their solutions in the banking and finance profession. It is captured by thirteen pairings including 'accurate vs. imprecise', 'challenging vs. easy' and 'mathematical vs. verbal'. These items Appendix B lists the items by dimension and from left to right by increasing strength in each dimension (i.e. less interest to more interest) though in the survey itself these items were randomised by classification and coding. The internal reliabilities of the responses within each dimension are 0.41 for individuality, 0.70 for structure, 0.72 for interest and 0.84 for precision. These compare favourably with a range of 0.89 to 0.64 for Saemann and Crooker's (1999) study where a similar survey instrument was employed.

In order to more accurately examine the underlying patterns of relationships among this large number of variables, and given that the study is primarily concerned with prediction, the items within each of the four dimensions are reduced using principal components analysis. The latent root criterion is employed to extract the significant linear combination of items within each dimension of perceptions. Ten factor scores with eigenvalues of the correlation matrix greater than unity are derived from the surveyed items as replacements for the original variables. One factor is selected for the interest dimension, two for individuality, four for precision and three for structure. These account for 50.333, 65.670, 55.916 and 54.119 percent of cumulative variance within each dimension, respectively. Table 2 provides details on the extracted components, eigenvalues, and percentage of variance and cumulative percentage of variance for these factor scores.

<TABLE 2 HERE>

The hypothesis underlying the factor score for interest (*INT*) follows the suggestion that students interested in a particular profession are more likely to select a major in that area. A positive coefficient is hypothesised when finance major is regressed against interest. The three remaining sets of factor scores relate to students' perceptions of the degree of individuality (*IND*), precision (*PRE*) and structure (*STR*) found in the finance profession. Conceptually speaking, students who score high on the several variables that have heavy loadings on the factor will obtain a high factor score on that factor. Thus the factor scores for interest, individuality, precision and structure can be interpreted as composite measures within each dimension, and therefore the *ex ante* signs on the estimated coefficients will be identical to that hypothesised for the original raw data. However, it is not known what influence the various perceptions of the finance profession will have on the choice of a finance major. For example, the finance profession may be seen as highly individualistic, though whether this encourages students to select a finance major will depend on the interaction with each student's own personality. Accordingly, no particular *a priori* sign is hypothesised when finance major is regressed against the factor scores represented by *IND*, *PRE* and *STR*.

The final set of information includes recorded student characteristics that are cross-tabulated with the survey data. Selected descriptive statistics are provided in Table 3. Characteristics recorded include each student's gender, nature of secondary school studies, grade point average to date and attendance mode. The first variable specified is a qualitative variable indicating whether the student is female (*GND*) (189 cases or 55.59 percent of the sample). The proportion of females found in the sample is comparable to that in the first-year student population. There is generally strong evidence to suggest that female undergraduates are less likely to take an introductory finance class, to continue in finance after completing the first introductory course, and to major in finance than are male undergraduates. A negative sign is hypothesised when finance major is regressed against student gender.

<TABLE 3 HERE>

The second set of student characteristics specified relate to experiences in secondary education. It is generally acknowledged that secondary school preparation for university study is linked with the choice of a major. In order to examine the interaction between studies in business-related disciplines at the secondary level and the choice of a finance major, three

qualitative variables are specified. These are whether the students undertook elective secondary studies in accounting (*ACC*) (163 students or 47.94 percent of cases) and/or business studies (*BUS*) (46 or 13.53 percent of cases) and/or economics (*ECO*) (128 or 37.65 percent of cases). Finance is not offered in Australia as a secondary school subject. Irrespective of this, as business-related studies all three variables could potentially be associated with an increase in the probability of selecting a finance major. As an alternative, previous study in accounting and economics may lead students to select a major in accounting or economics as against embarking upon the study of finance. The *ex ante* sign on *ACC*, *BUS* and *ECO* may therefore be positive or negative depending on the relative strength of these competing factors.

The final two variables specified in the analysis relate to additional student characteristics concerned with current attendance and performance. These are whether the student is attending on a part-time basis (*ATT*) (56 cases or 16.47 percent of the sample) and their grade point average to date (*GPA*). To start with, little is known about any systematic difference between a student's attendance pattern and the choice of major. However, as finance is regarded as being a relatively difficult subject [see, for instance, Krishnan *et al*. (1997) and Henebry and Diamond (1998)] it is hypothesised that part-time students may avoid this major due to resource (time) constraints. A negative coefficient is hypothesised when finance major is regressed against attendance pattern. And second, a number of studies have hypothesised a link between student performance at the tertiary level and the choice of the (more difficult) finance major. For example, Didia and Hasnat (1998) included the cumulative GPA in their analysis of performance in introductory finance, and this could be logically extended to persistence in a finance major. A positive coefficient is hypothesised.

Tests for differences in means and proportions for the explanatory variables in Table 3 indicate statistically significant differences between finance majors and non-majors. All other things being equal, finance majors have a higher personality score (*PRS*) (indicating a more creative individual) and a greater level of interest (*INT*) in the finance profession, and are less likely to be female (*GND*), to be studying part-time (*ATT*) and to have studied secondary school economics (*ECO*). The differences in means/proportions for finance majors and non-majors are insignificant for prior studies in accounting (*ACC*) or business (*BUS*) and past academic performance (*GPA*). Interpretation of the *t*/*Z*-tests on the perceptions of the profession factor scores is complicated by the fact that the levels of significance and magnitude of the factor scores varies within the various dimensions of individuality (*IND*), precision (*PRE*) and structure (*STR*). Nevertheless, finance majors generally view the banking

and finance profession as less individualistic (*IND1*, *IND2*), less precise (*PRE1*, *PRE3*) and having lesser structure (*STR1*) than non-majors. Interestingly, there appears to be very little interaction between personality (*PRS*) and the various perceptions of the profession (*INT*, *IND, PRE, STR*) with correlations ranging between 0.0018 for interest and 0.0825 for precision.

Empirical findings

Table 4 provides tests for differences in means and proportions across all survey questions (see Appendix B) and variables in the dataset. The first set of tests is between finance majors and non-majors while the second set is between females and males. Starting with the differences between finance majors and non-majors, the responses to the questions regarding perceptions throws some light on why magnitude and levels of significance varied across the factor scores discussed in Table 3, with the exception of interest (*INT*). For example, in terms of the individuality dimension (*IND*) there was no significant difference between finance majors and non-majors on whether they saw the profession as 'benefits society' or 'profit-driven', but finance majors on average saw it as more 'introverted' and 'number crunching', while non-majors saw it as having more 'interaction with others'.

<TABLE 4 HERE>

In a similar vein there were many questions regarding the degree of precision (*PRE*) in the profession that elicited no discernible differences in responses between finance majors and non-majors. These included the pairings of ambiguity vs. uncertainty, dynamic vs. stable, easy vs. challenging and originality vs. conformity. Similar variance across the dimension of structure (*STR*) is found. For example, finance majors on average saw the profession as accommodating alternative views and new solutions, yet also saw it as compliant and routine. No difference was found between finance majors and non-majors when confronted with the pairing of abstract vs. concrete, changing vs. fixed, effectiveness vs. efficiency and flexible vs. structured. Nonetheless, there are significant differences in perception responses between finance majors and non-majors across twenty-two of the thirty-six questions (61.1 percent).

It may also be useful to compare the perceptions of finance by finance and non-finance majors in this study with the perceptions of accounting by accounting and non-accounting majors as conducted by Saemann and Crooker (1999), especially given the close similarity of the survey instrument. A comparison of mean composite scores across the four dimensions of

perception indicates that the finance and non-finance majors in this study view the finance profession as more interesting, less structured, less precise and more individualistic than the accounting and non-accounting majors perceive the accounting profession in Saemann and Crooker's (1999, p. 14) study. For example, the mean interest score in finance in this study is 2.93 for finance majors and 3.24 for non-finance majors, while Saemann and Crooker's (1999, p. 14) interest in accounting by accounting and non-accounting majors is 2.56 and 3.15 respectively. Similarly, the mean perception of structure score is respectively 3.22 and 3.11 for finance and non-finance majors and 3.51 and 3.72 for accounting and non-accounting majors respectively. Lastly, the mean scores for precision and individualism in the finance profession are respectively 3.15 and 3.11 for finance majors and 3.35 and 3.42 for non-finance majors, while the scores for the accounting profession are respectively 3.48 and 2.95 for accounting majors and 3.65 and 3.26 for non-accounting majors. Interestingly, the personality score as an indicator of student creativity is significantly higher for both accounting (3.29) and non-accounting (3.73) majors in Saemann and Crooker's (1999, p. 14) than the creativity indicator for finance (2.59) and non-finance (1.75) majors in this study.

Table 4 also presents a similar analysis of the survey responses and other student characteristics for females and males. Strikingly, there are far fewer statistically significant differences in means and proportions between females and males than for majors and non-majors. To start with, and as indicated by *MAJ*, the proportion of females in finance majors is lower than males (19.05 percent compared to 31.13 percent). Females are also more likely to have studied secondary level accounting (*ACC*) and less likely economics (*ECO*), have a higher grade point average (*GPA*) and attend university part-time (*ATT*) than their male counterparts. And in terms of personality (*PRS*) males are on average more creative. However, in terms of perceptions of the profession there are remarkably few differences between females and males, with the mean responses between females and males only significantly different for five of the thirty-six questions (13.8 percent). In terms of these questions, female students saw the finance profession as more dull than exciting (*INT*), more extroverted than introverted (*IND*), more superficial than thorough (*PRE*) and encompassing more creative solutions than being cut and dry and more unpredictable than routine (*STR*) than male students. While the purported gender bias in finance education is thought to arise from a number of other sources, including male-orientated curriculum, pedagogy and evaluation, it appears to have little foundation in whether females and males differently view the profession.

The estimated coefficients, standard errors and *p*-values of the parameters for the probit regression are provided in Table 5. To facilitate comparability, marginal effects are also calculated. These indicate the marginal effect of each outcome on the probability of the choice of a finance major. In order to provide the marginal effects for the continuous variables, the standard normal density function is used with the index predictions evaluated at the sample means. Also included in Table 5 are statistics for joint hypothesis and likelihood ratio (LR) tests, the McFadden R^2 as an analogue for that used in the linear regression model, and the Hannan-Quinn (HQ) model specification criterion. Four separate models are estimated. The estimated coefficients and standard errors employing the entire set of student personality, perceptions and other characteristics are shown in Table 5 columns 1 to 4. The results of estimations using first, the set of personality and perception variables and then the set of other characteristics alone are detailed in columns 5 to 8 and 9 to 12 respectively. A final specification incorporating selected variables from both of these sets of characteristics and personality and perceptions is detailed in columns 13 to 16.

The estimated models are all highly significant, with likelihood ratio tests of the hypotheses that all of the slope coefficients are zero rejected at the 1 percent level or lower using the chi-square statistic. The results in these models also appear sensible in terms of both the precision of the estimates and the signs on the coefficients. To test for multicollinearity variance inflation factors (VIF) are calculated. As a rule of thumb, a VIF greater than ten indicates the presence of harmful collinearity. Amongst the explanatory variables the highest VIFs are for *PRE1* (2.073), *STR1* (2.814) and *INT1* (1.839). This suggests that multicollinearity, while present, is not too much of a problem. The R^2 of the regressions are fairly small ranging from .05 to .15, however this is typical for cross-sectional data and is comparable to Saemann and Crooker's (1999, p. 12) choice of accounting major model with R^2 between 0.15 and 0.18.

In the full specification, the estimated coefficients for interest (*INT1*), individuality (*IND1*), structure (*STR1* and *STR3*), gender (*GND*) and attendance (*ATT*) are significant at the 10 percent level of significance or lower and conform to *a priori* expectations with the exception of *IND1*. The estimated coefficients in the full specification indicate that students with a higher level of interest (*INT*) in the banking and finance profession and who perceive work relations within it as fairly individualistic (*IND*) are more likely to select a finance major, while students who perceive the profession as excessively structured (*STR*) are less likely to select a finance major. The three greatest marginal effects on the decision to undertake a finance major are gender (*GND*), such that female students are associated with a 7.95 percent

reduction in the probability of choosing a finance major, part-time attendance (*ATT*) where there is a 16.80 percent fall in the probability of selecting a finance major, and finally, students who perceive the banking and finance profession as highly structured (*STR1*) are 10.19 percent less likely to select a corresponding finance major.

<TABLE 5 HERE>

These results are generally consistent with the estimated coefficients in the second regression where only the set of personality and perception characteristics are included. The estimated coefficients for the interest (*INT*), individuality (*IND*) and structure (*STR*) parameters found to be significant in the initial specification are also significant (at higher levels) in the nested model. In addition, in the second regression the estimated coefficient for personality (*PRS*) is significant at the 10 percent level of significance and the sign conforms to *a priori* expectations. The change in significance in this model and the statistically significant differences between finance and non-finance majors in Table 3 suggests at least some of the variability in personality can be explained by student characteristics such as gender, secondary school studies, attendance and grade point average. This could be expected given the simple nature of this measure.

The results in the third regression where the model is re-estimated with only the set of other student characteristics also conform to the fully specified model. Gender (*GND*) and attendance (*ATT*) are significant at the .05 level and the signs on these coefficients are consistent with *a priori* expectations. An incremental contribution of variables *F*-test is used to reject the null hypotheses that the finance major model could be estimated on the basis of either the nested 'no other characteristic effect' [$F = 2.7042$] or 'no personality/perception effect' [$F = 3.2648$] models at the .05 level, and we may conclude that students' choice of a finance major is a function of both student personalty and perceptions of the finance profession, along with the more readily observed student characteristics such as past secondary studies, GPA, gender and attendance pattern.

In order to further refine the model specification, *F* tests were used to test combinations of coefficients for redundancy. In this approach, the increase in the explained sum of squares for the model with more regressors iss compared with the model with less regressors, adjusted for the number of incremental regressors and tested for significance, and on this basis the variables for *PRE* ($F = 0.3577$, *p*-value = 0.8386), *ACC*, *BUS* and *ECO* ($F = 0.5161$, *p*-value = 0.6715) were excluded from the final specification. We may conclude that perceptions of

the degree of precision (*PRE*) in the banking and finance profession and secondary studies in related business areas exert no significant influence on the probability of selecting a finance major. Each of the remaining variables was tested in a similar manner, though failing to be excluded from the final specification. The refined model is presented in columns 13 to 16 of Table 5. The likelihood ratio for the refined model is significant at the 1 percent level of significance, and we may conclude that the explanatory variables as a group can be used to investigate the choice of a finance major. While the R^2 of the final specification (0.1390) is lower than that of the full specification (0.1495) the Hannan-Quinn (HQ) criteria, reflecting the trade-off between goodness of fit and model complexity, suggests that the final specification is more appropriate (a lower HQ value).

It would appear from the final specification that the primary influences on students' selection of a major in finance are the level of interest (*INT*), and perceptions of individuality (*IND*) and structure (*STR*) in the banking and finance profession, gender (*GND*) and mode of attendance (*ATT*). Of these variables, the largest negative marginal effect on the probability of choosing a choice of a finance major is the mode of attendance, followed by perceptions of the profession as excessively structured, and finally gender. As could be expected, the primary positive influence on the choice of a finance major is the level of interest (*INT*) in the finance profession. However, an emphasis on the significance of individual coefficients in this regression model is likely to obscure the complex and important interaction of a number of other factors on the decision to major in finance. For example, while several other variables are individually insignificant, including additional dimensions of structure in finance, student personality and grade point average, they could not be excluded from the model under any conventional criteria.

As a final requirement, the ability of the various models to accurately predict outcomes in each student's choice of major is examined. Table 6 provides the predicted results for each model specification and compares these to the probabilities obtained from a constant probability model. The probabilities in the constant probability model are the values computed from estimating a model that includes only an intercept term, and thereby correspond to the probability of correctly identifying finance and non-finance majors on the basis of the proportion of finance and non-finance majors in the sample. The absolute gain in Table 6 is the percentage change of correct predictions of the estimated models over the percentage of correct predictions in the constant probability model. The relative gain is the absolute gain as a percentage of the incorrect predictions in the constant probability model.

<TABLE 6 HERE>

To start with, on the basis of the 257 non-finance majors in the sample, the full model specification identifies 204.44 cases (79.55 percent) as non-finance majors and 52.56 cases (20.45 percent) as finance majors. These figures represent a 3.96 percent absolute gain or improvement over the constant probability model, and a relative gain of 16.22 percent. Of the 83 students in the sample who selected a finance major, the full specification correctly identifies 30.78 (37.09 percent) as finance majors and 52.22 (62.91 percent) as non-finance majors, representing a 12.68 percent absolute gain and a 16.77 relative gain. Overall, the full specification correctly identifies 235.23 students (69.18 percent) as either finance or non-finance majors and incorrectly identifies 104.77 (30.82 percent) students as either finance or non-finance majors. This reflects an absolute improvement of 6.09 percent over the constant probability model (in terms of correct predictions) and a relative improvement of 16.50 percent over the constant probability model (in terms of incorrect predictions). The Hosmer-Lemeshow goodness-of-fit test statistic (HL = 7.6833, p-value = 0.4685) in Table 5 fails to reject the null hypothesis of no functional misspecification for the full specification.

These results are broadly comparable to the number and percentage of correct predictions for the 'no other characteristic effect', 'no personality/perceptions effect' and 'final specification' models. However, one interesting difference is that the full specification incorporating personality and perception effects provides an absolute gain of 3.54 percent over the 'no personality/perception effect' model for non-finance majors and 30.92 percent for finance majors, and a relative gain of 11.73 and 12.22 percent respectively. This suggests that the predictive abilities of choice of major models are substantially improved by the incorporation of explanatory variables relating to student personality and perceptions of the corresponding profession. This reinforces the findings of the Hosmer-Lemeshow statistic for the 'no personality/perception effect' where the null hypothesis of no functional misspecification is rejected at the .05 level. Of course, these are 'in-sample' predictions and the results could differ markedly if 'out-of-sample' data was made available.

Conclusion

The present study uses a binary probit model to investigate the role of student personality, perceptions and other characteristics in determining the choice of major for Australian business students. The current paper extends empirical work in this area in at least two ways. First, it represents the first attempt to apply qualitative statistical models of choice of business

major in Australia. In fact no comparable study is thought to exist elsewhere in terms of the focus on the finance discipline. The evidence provided suggests that the choice of a finance major is a function (at least in the context of models of this type) of students' perceptions of individualilty, structure and interest in the banking and finance profession, mode of attendance and, to a lesser extent, gender.

Second, the study analyses in detail the varying influences of personality/perception and other student characteristics. The results indicate that students' physical and educational characteristics, whilst in themselves useful indicators of a student's choice of major, may be supplemented by factors associated with student personality and perceptions of the profession. On the basis of the explanatory variables specified, the major of some 69 percent of students can be correctly identified. Unfortunately, from a policy perspective the results do more to identify likely non-finance majors, than to present possible ways to increase the likelihood of students selecting a major in finance. Nevertheless, a number of policy changes are suggested.

First, it has been shown that the level of student interest in the profession is seen as a major factor in the choice of a finance major. This is important because any policy change will need to recognise that interests remain relatively stable over time, they are not very amenable to change, and probably weigh heavily in the decisions of most students. One policy change may include strenuous efforts to stimulate the interest of students in introductory classes, which may encourage them to change their major to finance. Other changes could include promotional activities by the professional associations, educators and employers to highlight to prospective students the diverse and interesting roles of finance practitioners.

Second, there could also be a more concerted effort to communicate to all business students the benefit of incorporating at least some finance subjects into their studies. The analysis of the differences in means for at least some survey questions suggests that non-majors may actually find the profession more interesting than finance majors. Nevertheless, interest in the profession does not always seem to be translated into additional finance majors. One obvious problem is that present degree programs may hinder the ability of students to select majors in areas that actually interest them. For example, the stringent professional requirements of the accounting associations in Australia and elsewhere usually mean that it is difficult for accounting majors to include majors outside of their specialised degree program. University educators and administrators can assist this process by providing degrees that can readily incorporate double majors, sub-majors and specialisations in finance, while partnerships could also be developed with disciplines that have synergies with finance such as mathematics and information technology.

Finally, the analysis also found that gender has a role to play in the choice of a finance major. While at least some 'gender bias' is removed when perceptions and attitudes to the profession are taken into account, the fact remains that female students are much less likely to select a major in finance than their male counterparts. The suggestion that the finance curriculum, along with the pedagogy and types of evaluation instruments, includes topics and methodology of less interest to women, and that the evaluation favours male learning styles is a matter of some concern. Possible policy changes include a greater effort by educators to make the finance curriculum more gender inclusive and ensuring that evaluation does not favour male learning styles. More generally, there is also the requirement that teaching faculty are gender balanced and that students are presented with female role models and mentors.

Of course, the study does suffer a number of limitations, all of which suggest directions for future research. To start with, one limitation is that the sample upon which this study is based is drawn from a single university. While this means that many unspecified influences are held constant, it also suggests that the results could differ from other institutional contexts. For example, in the university selected there is a very broad range of majors available in a single business degree and no specific accounting or economics degree. The results could then differ from universities that offer more specialised degree programs. One direction for future research could therefore entail a sample drawn from several different universities, perhaps in different countries.

A second limitation is that the data used contains no information concerning many other factors likely to impact upon a given student's choice of major. For example, some surveys have included specific questions about expected career financial remuneration, promotional opportunities, career path, compatibility with family commitments and the availability of role models. For instance, Rumberger and Thomas (1993) examined future returns to the choice of college major, while Henebry and Diamond's (1998) study considered the interaction between students' experiences in finance and the teaching environment. And in a broader context, Pearson and Dellman-Jenkins (1997) investigated the role of parental influence on a student's selection of a college major.

A final limitation is that studies of students' choice of major need to incorporate more fully economic models of occupational choice. For example, Easterlin (1995) examined the switch to business majors in the 1980s in the context of preferences and the relative returns from alternative occupations. A comparable analysis could be made between closely substitutable business-related disciplines, such as finance, accounting and economics. This is important because, finance, at least in part, is viewed as an alternative to accounting in preparing

students for careers in investment banking, corporate finance and business advisory services. Regrettably, detailed information of this type was not available.

References

Albrecht, W.S. and Sack, R.J. (2001) The perilous future of accounting education, *The CPA Journal* **71** (3) March, 16–23.

Anderson, M. and Johnson, D. (1992) Economics in schools, *Australian Economic Review* **3** (1) 3rd Quarter, 59–73.

Bauer, R.J. and Dahlquist, J.R. (1999) Recognizing and eliminating gender bias in finance education, *Financial Practice and Education* **9** (1) Spring/Summer, 83–91.

Booth, P and Winzar, H (1993) Personality biases of accounting students: some implications for learning style preferences, *Accounting and Finance* **33** (2) November, 109–120.

Cohen, J. and Hanno, D.M. (1993) An analysis of the underlying constructs affecting the choice of accounting as a major, *Issues in Accounting Education* **8** (2) Fall, 219–238.

Didia, D. and Hasnat, B. (1998) The determinants of performance in the university introductory finance course, *Financial Practice and Education* **8** (1) Spring/Summer, 102–107.

Dynan, KE and Rouse CE (1997) The underrepresentation of women in economics: a study of undergraduate students, *Journal of Economic Education*, **28** (4) Fall, 350–368.

Easterlin, R.A. (1995) Preferences and prices in choice of career: the switch to business, 1972-87, *Journal of Economic Behavior and Organization* **27** (1) June, 1–34.

Fortin, A. and Amernic, J.H. (1994) A descriptive profile of intermediate accounting students, *Contemporary Accounting Research* Special Education Research Issue, 21–73.

Geiger, M.A. and Ogilby, S.M. (2000) The first course in accounting: students' perceptions and their effect on the decision to major in accounting, *Journal of Accounting Education* **18** (1) March, 63–78.

Gough, HG (1979) A creative personality scale for the adjective check list, *Journal of Personality and Social Psychology* **37**, 1398–1405.

Gul, F.A. and Fong, S.C.C. (1993) Predicting success for introductory accounting students: some further Hong Kong experience, *Accounting Education* **2** (1) September, 33–42.

Henebry, K.L. and Diamond, J.M. (1998) The impact of student and professor gender on grade performance in the managerial finance course, *Financial Practice and Education* **8** (1) Spring/Summer, 94–101.

Jackling, B. (2001) *Is Accounting an Attractive Career Choice for Commerce Undergraduates?* Paper presented to the Accounting Association of Australia and New Zealand (AAANZ) Annual Conference, Auckland, New Zealand.

Jensen, E.J. and Owen A.L. (2000) Why are women such reluctant economists? evidence from liberal arts colleges, *American Economic Review* **90** (2) May, 466–470.

Koh, M.Y. and Koh, H.C. (1999) The determinants of performance in an accountancy degree program, *Accounting Education* **8** (1) March, 13–29.

Krishnan, V.S. Bathala, C.T. Bhattacharya, T.K. and Ritchey, R. (1997) Teaching the introductory finance course: what can we learn from student perceptions and expectations? *Financial Practice and Education* **9** (1) Spring/Summer, 70–82.

Lawrence, R. and Taylor, L.W. (2000) Student personality type versus grading procedures in intermediate accounting courses, *Journal of Education for Business* **76** (1) September/October, 28–35.

Lewis, P. and Norris, K. (1997) Recent changes in economics enrolments, *Economic Papers* **16** (1) March, 1–13.

Millmow, A. (1995) The market for economists in Australia, *Economic Papers* **14** (4) December, 83–96.

Millmow, A. (2000) The state we're in: university economics 1989/1999, *Economic Papers* **19** (4) December, 43–52.

Mladenovic, R. (2000) An investigation into ways of challenging introductory accounting students' negative perceptions of accounting, *Accounting Education* **9** (2) June, 135–155.

Myers I.B. and McCaulley, M.H. (1985) *A Guide to the Development and Use of the Myers-Briggs Type Indicator*, Consulting Psychologists Press, Palo Alto.

Oswick, C. and Barber, P. (1998) Personality type and performance in an introductory level accounting course: a research note, *Accounting Education* **7** (3) September, 249–254.

Pearson, C and Dellmann-Jenkins M (1997) Parental influence on a student's selection of a college major, *College Student Journal* **31** (3) September, 301–313.

Ramsey, A., Hanlon, D. and Smith, D. (2000) The association between cognitive style and accounting students' preference for cooperative learning: an empirical investigation, *Journal of Accounting Education* **18** (2) Spring, 215–228.

Rumberger, RW and Thomas SL (1993) The economic returns to college major, quality and performance: a multilevel analysis of recent graduates, *Economics of Education Review* **12** (1), 1–19.

Saemann, G.P. and Crooker, K.J. (1999) Students perceptions of the profession and its effect on decisions to major in accounting, *Journal of Accounting Education* **17** (1) Winter, 1–22.

Sen, S. Joyce, P. Farrell, K. and Toutant, J. (1997) Performance in principles of finance courses by students with different specialisations, *Financial Practice and Education* **7** (2) Fall/Winter, 66–73.

Stice JD Swain MR and Worsham RG 1997. The effect of performance on the decision to major in accounting, *Journal of Education for Business* **73** (1) September/October, 54–57.

Turner, J.L., Holmes, S.A. and Wiggins, C.E. (1997) Factors associated with grades in intermediate accounting, *Journal of Accounting Education* **15** (2) Spring, 269–288.

Wolk, C.M. and Cates, T.A. (1994) Problem-solving styles of accounting students: Are expectations of innovation reasonable? *Journal of Accounting Educati*on **12** (4) Spring, 268–281.

Wolk, C.M and Nikolai, L.A. (1997) Personality types of accounting students and faculty: Comparisons and implications, *Journal of Accounting Education* **15** (1) Winter, 1–17.

Worthington, A.C. and Higgs, H. (2001) Australian accounting enrolments and student load: an empirical note on trends and composition through the 1990s, *Accounting Research Journal* **14** (2), 186–199.

Appendices

Appendix A. Personality score checklist

_____ clever	_____ capable	_____ cautious^
_____ commonplace^	_____ confident	_____ conservative^
_____ conventional^	_____ dissatisfied^	_____ egotistical
_____ honest^	_____ humorous	_____ individualistic
_____ informal	_____ insightful	_____ intelligent
_____ inventive	_____ mannerly^	_____ narrow interests^
_____ original	_____ pompous^	_____ reflective
_____ resourceful	_____ self-confident	_____ sexy
_____ sincere^	_____ snobbish	_____ submissive^
_____suspicious^	_____ unconventional	_____ wide interests

Notes: ^ Denotes items given a score of –1 if checked by the subject; all other items were scored +1 if checked.

Appendix B. Perceptions of the banking and finance profession

Interest (INT)	1	Boring	1…5	Interesting
	2	Dull	1…5	Exciting
	3	Monotonous	1…5	Fascinating
	4	Ordinary	1…5	Prestigious
	5	Tedious	1…5	Absorbing
Individuality (IND)	1	Benefits Society	1…5	Profit-Driven
	2	Extrovert	1…5	Introvert
	3	People-Oriented	1…5	Number Crunching
	4	Interaction With Others	1…5	Solitary
Precision (PRE)	1	Ambiguity	1…5	Certainty
	2	Analytical	1…5	Conceptual
	3	Dynamic	1…5	Stable
	4	Easy	1…5	Challenging
	5	Imprecise	1…5	Accurate
	6	Intuition	1…5	Facts
	7	Novelty	1…5	Methodical
	8	Originality	1…5	Conformity
	9	Overview	1…5	Details
	10	Spontaneous	1…5	Planned
	11	Superficial	1…5	Thorough
	12	Theoretical	1…5	Practical
	13	Variety	1…5	Repetition
	14	Verbal	1…5	Mathematical
Structure (STR)	1	Abstract	1…5	Concrete
	2	Adaptable	1…5	Inflexible
	3	Alternative Views	1…5	Uniform Standards
	4	Changing	1…5	Fixed
	5	Creative Solutions	1…5	Cut & Dry
	6	Decision Making	1…5	Record Keeping
	7	Effectiveness	1…5	Efficiency
	8	Flexible	1…5	Structured
	9	Imagination	1…5	Logic
	10	Innovation	1…5	Compliance
	11	New Ideas	1…5	Established Rules
	12	New Solutions	1…5	Standard Procedures
	13	Unpredictable	1…5	Routine

Table 1. Undergraduate enrolments in business majors and degrees at Australian universities

	Accounting majors and degrees	*Economics majors and degrees*	*Finance majors and degrees*	*Other business majors and degrees*	*All business majors and degrees*
Total number enrolled in 1990	24097	8207	1986	50546	84836
Total number enrolled in 1999	26253	8473	6459	85754	126939
Percentage increase	8.95	3.24	225.23	69.65	49.62
Annualised percentage growth rate	0.86	0.32	12.52	5.43	4.11

Source: Department of Education, Training and Youth Affairs (1989-1999) *Selected Higher Education Student Statistics*, AGPS, Canberra.

Notes: Presents number of undergraduate students enrolled in 1990 and 1999 and overall and annualised percentage change. 'Other business majors and degrees' category includes human resource management, international business, general management, industrial relations, marketing, etc.

Table 2. Total variance explained by extracted principal components

Variable set	*Component*	*Eigenvalue*	*Percentage of variance*	*Cumulative percentage of variance*
Interest (5)	INT1	2.465	50.333	50.333
Individuality (4)	IND1	1.669	38.157	38.157
	IND2	1.203	27.512	65.670
Precision (14)	PRE1	3.301	23.673	23.673
	PRE2	2.000	14.345	38.018
	PRE3	1.300	9.326	47.344
	PRE4	1.195	8.572	55.916
Structure (13)	STR1	5.191	36.501	36.501
	STR2	1.400	9.847	46.348
	STR3	1.105	7.772	54.119

Notes: The number of principal components extracted from each set of questions is determined by the latent root criterion where only components having eigenvalues greater than unity are considered significant. The numbers of original variables for each variable set are in brackets.

Table 3. Tests for differences in means and proportions for explanatory variables in probit regression

	Variable description		*Finance majors*		*Non-finance majors*		*t/Z-tests*	
			Mean	*Standard deviation*	*Mean*	*Standard deviation*	*Absolute t/Z-value*	*p-value*
Personality and perception characteristics	Personality score	PRS	2.5904	3.6192	1.7549	3.0794	1.8934	0.0607
	Interest factor score (1)	INT1	0.4190	0.9452	-0.1353	0.9812	4.5143	0.0000
	Individuality factor score (1)	IND1	-0.0359	0.8995	0.0116	1.0317	0.3756	0.7074
	Individuality factor score (2)	IND2	-0.2096	1.0055	0.0677	0.9907	2.2092	0.0278
	Precision factor score (1)	PRE1	-0.1634	1.0096	0.0528	0.9931	1.7169	0.0869
	Precision factor score (2)	PRE2	0.2617	1.1108	-0.0845	0.9485	2.7689	0.0059
	Precision factor score (3)	PRE3	-0.2000	1.1280	0.0646	0.9484	2.1059	0.0359
	Precision factor score (4)	PRE4	0.0171	0.8552	-0.0055	1.0439	0.1789	0.8581
	Structure factor score (1)	STR1	-0.4249	1.0125	0.1372	0.9583	4.5822	0.0000
	Structure factor score (2)	STR2	0.0206	0.9245	-0.0066	1.0248	0.2153	0.8297
	Structure factor score (3)	STR3	-0.0692	0.9692	0.0224	1.0106	0.7249	0.4690
Other characteristics	Female	GND	0.4337	0.4986	0.5953	0.4918	2.5636	0.0104
	Secondary accounting studies	ACC	0.5301	0.5021	0.4630	0.4996	1.0631	0.2877
	Secondary business studies	BUS	0.1084	0.3128	0.1440	0.3517	0.8753	0.3814
	Secondary economics studies	ECO	0.4578	0.5012	0.3502	0.4780	1.7213	0.0852
	Part-time attendance	ATT	0.0723	0.2605	0.1946	0.3966	3.1979	0.0014
	Grade point average	GPA	4.4859	1.0355	4.6418	0.9411	1.2801	0.2014

Notes: For the continuous variables (PRS, INT1, IND1, IND2, PRE1, PRE2, PRE3, PRE4, STR1, STR2, STR3 and GPA) Levene's test for equality of variances determines whether the *t*-values and *p*-values for equality of means assume equal or unequal variances. For the binary variables (GND, ACC, BUS, ECO and ATT) the *Z* and *p*-values are for differences between proportions.

Table 4. Tests for differences in means and proportions for survey and characteristic variables

		Tests between finance and non-finance majors				*Tests between females and males*			
		Finance majors	*Non-finance majors*	*Absolute t/Z-value*	*p-value*	*Females*	*Males*	*Absolute t/Z-value*	*p-value*
MAJ		–	–	–	–	0.1905	0.3113	2.5761	0.0100
PRS		2.5904	1.7549	1.8934	0.0607	1.5714	2.4437	2.4900	0.0133
INT	1	3.2410	3.4319	1.6551	0.0988	3.4497	3.3046	1.4534	0.1470
	2	2.7108	3.0350	2.6737	0.0079	2.8571	3.0795	2.1127	0.0354
	3	3.0602	3.3502	2.2156	0.0274	3.2857	3.2715	0.1245	0.9010
	4	2.6988	3.0895	2.7881	0.0056	2.9683	3.0265	0.4754	0.6348
	5	2.9639	3.3074	2.3752	0.0181	3.2540	3.1854	0.5438	0.5869
IND	1	2.9759	3.1518	1.4980	0.1361	3.1005	3.1192	0.1714	0.8640
	2	3.0964	3.4630	3.0367	0.0026	3.4021	3.3377	0.6087	0.5431
	3	3.3614	3.6576	2.4773	0.0137	3.6243	3.5364	0.8439	0.3993
	4	3.0241	3.4125	3.2621	0.0014	3.3386	3.2914	0.4343	0.6643
PRE	1	2.8554	3.3735	3.7800	0.0002	3.2434	3.2517	0.0684	0.9455
	2	2.9398	3.2023	1.9259	0.0550	3.2646	2.9801	2.4205	0.0160
	3	2.9157	3.2879	2.7497	0.0066	3.2487	3.1325	0.9082	0.3644
	4	2.8554	3.4553	4.5288	0.0000	3.3704	3.2318	1.1775	0.2398
	5	3.2892	3.4008	0.8992	0.3692	3.4497	3.2781	1.6030	0.1099
	6	2.6988	2.6809	0.1384	0.8900	2.7196	2.6424	0.6922	0.4893
	7	2.6747	3.0973	3.2670	0.0012	3.0476	2.9272	1.0492	0.2949
	8	3.2048	3.4630	1.9355	0.0538	3.4286	3.3642	0.5550	0.5793
	9	3.4819	3.6420	1.4038	0.1613	3.6243	3.5762	0.4874	0.6263
	10	3.5301	3.3619	1.3446	0.1796	3.4709	3.3179	1.3927	0.1647
	11	3.0723	3.3424	2.3702	0.0183	3.3862	3.1391	2.5111	0.0125
	12	3.4940	3.4708	0.1866	0.8521	3.5026	3.4437	0.5494	0.5831
	13	3.7470	3.7237	0.1823	0.8555	3.8307	3.6026	2.0418	0.0421
	14	3.3976	3.4475	0.4675	0.6408	3.4603	3.4040	0.5486	0.5837
STR	1	3.3133	3.4864	1.3513	0.1775	3.5185	3.3510	1.5135	0.1311
	2	3.2289	3.2179	0.0804	0.9360	3.2275	3.2119	0.1316	0.8954
	3	3.0241	3.3696	2.5356	0.0117	3.3280	3.2318	0.7988	0.4250
	4	3.4699	3.3502	1.0321	0.3028	3.3598	3.4040	0.4402	0.6601
	5	3.5422	3.3424	1.3767	0.1695	3.2646	3.5497	2.2839	0.0230
	6	2.8916	3.2101	2.8195	0.0051	3.0794	3.1987	1.2100	0.2271
	7	3.3253	3.3891	0.4527	0.6511	3.3757	3.3709	0.0394	0.9686
	8	2.7229	2.7782	0.4401	0.6601	2.8042	2.7152	0.8196	0.4130
	9	3.4819	3.0078	3.5387	0.0005	3.1111	3.1391	0.2371	0.8128
	10	3.2530	2.8093	3.4970	0.0005	2.9153	2.9205	0.0464	0.9630
	11	3.1446	2.7743	3.0180	0.0027	2.8783	2.8477	0.2850	0.7759
	12	3.3373	3.0078	2.8156	0.0052	3.1058	3.0662	0.3868	0.6991
	13	3.1205	2.7899	2.8799	0.0042	2.7672	3.0000	2.3418	0.0198
ACC		0.5301	0.4630	1.0636	0.2875	0.5291	0.4172	2.0518	0.0402
BUS		0.1084	0.1440	0.8229	0.4106	0.1323	0.1391	0.1821	0.8555
ECO		0.4578	0.3502	1.7597	0.0785	0.3122	0.4570	2.7378	0.0062
GPA		4.4859	4.6418	1.2801	0.2014	4.6981	4.4857	2.0237	0.0438
ATT		0.0723	0.1946	2.6109	0.0090	0.1958	0.1258	1.7275	0.0841
GND		0.4337	0.5953	2.5761	0.0100	–	–	–	–

Notes: For the continuous variables Levene's test for equality of variances determines whether the *t*-values and *p*-values for equality of means assume equal or unequal variances. MAJ is a dummy variable indicating a finance major. For the binary variables (GND, ACC, BUS, ECO, ATT and MAJ) the *Z* and *p*-values are for differences between proportions. The ordering of the survey responses for the Interest (INT), Individuality (IND), Precision (PRE) and Structure (STR) survey questions correspond to Appendix B.

Table 5. Binary probit model maximum-likelihood estimates

	Full specification				*No other characteristic effect*				*No personality/perception effect*				*Final specification*			
Variable	*Estimated coefficient*	*Standard Error*	*p-value*	*Marginal effect*	*Estimated coefficient*	*Standard Error*	*p-value*	*Marginal effect*	*Estimated coefficient*	*Standard Error*	*p-value*	*Marginal effect*	*Estimated coefficient*	*Standard Error*	*p-value*	*Marginal effect*
CONS.	-0.0466	0.4384	0.9153		-0.8545	0.0977	0.0000		-0.2092	0.3922	0.5937		0.0117	0.4180	0.9777	
PRS	0.0408	0.0254	0.1085	0.0109	0.0454	0.0245	0.0635	0.0127					0.0385	0.0251	0.1253	0.0104
INT1	0.2555	0.1086	0.0186	0.0681	0.2447	0.1049	0.0197	0.0683					0.3027	0.0963	0.0017	0.0819
IND1	0.1814	0.0984	0.0653	0.0484	0.1950	0.0928	0.0357	0.0545					0.1950	0.0969	0.0442	0.0528
IND2	-0.1408	0.0875	0.1076	-0.0376	-0.0886	0.0825	0.2825	-0.0248					-0.1318	0.0860	0.1255	-0.0357
PRE1	0.1214	0.1144	0.2884	0.0324	0.0351	0.1115	0.7532	0.0098								
PRE2	-0.0408	0.1038	0.6940	-0.0109	-0.0213	0.1032	0.8365	-0.0059								
PRE3	-0.0645	0.0795	0.4168	-0.0172	-0.0591	0.0805	0.4626	-0.0165								
PRE4	0.0441	0.0859	0.6077	0.0118	0.0182	0.0865	0.8338	0.0051								
STR1	-0.3820	0.1354	0.0048	-0.1019	-0.3675	0.1306	0.0049	-0.1026					-0.2993	0.1098	0.0064	-0.0810
STR2	-0.1089	0.0839	0.1944	-0.0290	-0.0894	0.0842	0.2886	-0.0250					-0.1167	0.0748	0.1187	-0.0316
STR3	-0.1387	0.0813	0.0880	-0.0370	-0.1156	0.0771	0.1336	-0.0323					-0.1191	0.0797	0.1351	-0.0322
GND	-0.2981	0.1651	0.0710	-0.0795					-0.3495	0.1560	0.0250	-0.1045	-0.2741	0.1632	0.0931	-0.0741
ACC	0.1932	0.1663	0.2451	0.0515					0.1968	0.1543	0.2022	0.0588				
BUS	-0.1152	0.2567	0.6538	-0.0307					-0.2535	0.2343	0.2793	-0.0758				
ECO	0.0971	0.1680	0.5636	0.0259					0.1372	0.1562	0.3800	0.0410				
ATT	-0.6302	0.2609	0.0157	-0.1680					-0.5617	0.2452	0.0220	-0.1679	-0.5995	0.2610	0.0216	-0.1622
GPA	-0.1506	0.0919	0.1012	-0.0402					-0.0756	0.0830	0.3627	-0.0226	-0.1398	0.0889	0.1160	-0.0378
l	160.7235				168.6981				179.9796				162.6902			
$l(0)$	188.9652				188.9652				188.9652				188.9652			
LR	56.4835		0.0000		40.5341		0.0000		17.9712		0.0063		52.5499		0.0000	
HQ	1.1321				1.1168				1.1313				1.0711			
R^2	0.1495				0.1073				0.0476				0.1390			

Notes: l – log-likelihood, $l(0)$ – restricted slopes log-likelihood, LR – likelihood ratio statistic; p-value of LR calculated using $\chi^2(p)$ where p = number of explanatory variables; HQ – Hannan-Quinn model selection criterion; R^2 – McFadden R-squared; marginal effects calculated at sample means.

Table 6. Observed and predicted values for the binary probit models

		Non-finance majors		*Finance majors*		*All majors*		*Hosmer-Lemeshow*	
		Number	*Percent*	*Number*	*Percent*	*Number*	*Percent*	*Statistic*	*p-value*
Constant probability model	Correct	194.26	75.59	20.26	24.41	214.52	63.10	NA	NA
	Incorrect	62.74	24.41	62.74	75.59	125.48	36.90		
	Absolute gain	NA		NA		NA			
	Relative gain	NA		NA		NA			
Full specification	Correct	204.44	79.55	30.78	37.09	235.23	69.18	7.6833	0.4650
	Incorrect	52.56	20.45	52.22	62.91	104.77	30.82		
	Absolute gain	10.18	3.96	10.52	12.68	20.71	6.09		
	Relative gain		16.22		16.77		16.50		
No other characteristic effect	Correct	201.81	78.53	28.19	33.97	230.01	67.65	7.7731	0.4559
	Incorrect	55.19	21.47	54.81	66.03	109.99	32.35		
	Absolute gain	7.55	2.94	7.93	9.56	15.49	4.55		
	Relative gain		12.04		12.65		12.34		
No personality or perception effect	Correct	197.45	76.83	23.51	28.32	220.96	64.99	14.2308	0.0759
	Incorrect	59.55	23.17	59.49	71.68	119.04	35.01		
	Absolute gain	3.19	1.24	3.25	3.91	6.44	1.89		
	Relative gain		5.09		5.17		5.12		
Final specification	Correct	203.68	79.25	30.24	36.44	233.93	68.80	5.4298	0.7108
	Incorrect	53.32	20.75	52.76	63.56	106.07	31.20		
	Absolute gain	9.42	3.67	9.98	12.02	19.41	5.71		
	Relative gain		15.02		15.91		15.46		